

# 15-25K Static-Helium Regenerator/Double Pulse Tube Cooler for Receiving Arrays, Phase I

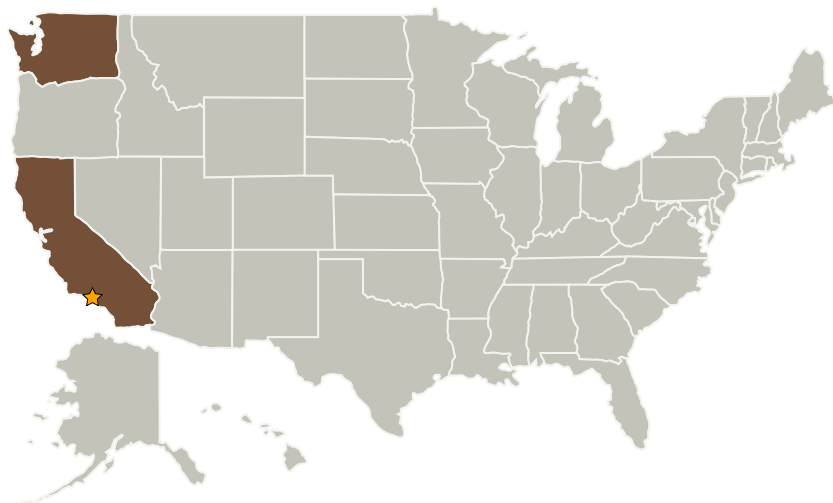
Completed Technology Project (2006 - 2006)



## Project Introduction

NASA needs a cryogenic refrigerator for the 15-25K range for receiving arrays of ground-based antennas that will serve the telecommunications needs of future space exploration. We propose to develop a 15-25K Static-Helium Regenerator/Double Pulse Tube Cooler for receiving arrays. Our SHR/DPTC combines two of our technologies that have potential to enable pulse-tube coolers to operate efficiently in the 15-25K range: (1) our Static-Helium Regenerator (SHR) technology, which uses static helium for the regenerator's thermal mass; and (2) our Double Pulse Tube Cooler (DPTC) technology, which uses a recuperator (instead of regenerators) to transfer heat between two pulse-tube sub-cycles that operate in parallel and out-of-phase. In Phase I, we will perform system trades and generate a preliminary design of a 15-25K SHR/DPTC that minimizes life-cycle costs for receiving arrays. In Phase II, we will: develop and test SHR/DPTC components; integrate the SHR/DPTC components with cooler components we have already developed; and test the integrated cooler. In Phase III, we will build and sell SHR/DPTCs to the government and private sector.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Beck Engineering, Inc.	Supporting Organization	Industry	Port Orchard, Washington

## Primary U.S. Work Locations

California	Washington
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - └ TX14.1 Cryogenic Systems
    - └ TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors